Joint Data Support (JDS)

Study Support Process

Version 2.0

February 2002

February 2002

NOTE TO USERS

This supersedes version 1.0 of the Joint Data Support (JDS) Study Support Plan, dated December 2001.

The changes to the previous version were minor wording changes to enhance clarity of expression, and occur on pages 10, 12, 13, 15, 16, 34, and 36.

JDS plans to conduct an annual review / revision of this document.

Recommendations for changes are most welcome at any time. Please send them to one or both of the following:

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Purpose

This document describes the process by which Joint Data Support (JDS) provides data support to Department of Defense (DoD) analytical studies. It contains procedures for Study Directors and others to successfully interact with JDS; and it contains procedures JDS will follow internally in support of Joint studies and analyses.

This document is intended to show application of and support for—not conflict with—applicable DoD guidance, such as:

- DoD Instruction 5000.61, "DoD Modeling and Simulation (M&S) Verification, Validation, and Accreditation (VV&A),"
- DoD Directive 5000.59, "DoD Modeling and Simulation (M&S) Management,"
- DoD Manual 8320.1-M, "Data Administration Procedures,"

Any questions regarding this document can be forwarded to the JDS Director.

The main section of this document is intended primarily for JDS external customers; Tab D goes into more detail concerning each step.

Executive summary

Why Joint Data Support?

Our mission. Joint Data Support (JDS) provides quality data and other support services to Department of Defense studies and analyses. We provide and manage data primarily (but not exclusively) in support of the Joint Analytical Model Improvement Program (JAMIP) legacy suite of models[1]; and we provide data support for Joint Warfare System (JWARS) development and fielding.

What we are. JDS is an integral part of the JAMIP. JDS was created in the mid-1990s to address key problems in DoD data management practices. It is assigned to the Office of the Secretary of Defense (Program Analysis and Evaluation [PA&E]), but operates under strict data releasability rules, which apply equally to PA&E as to other organizations.

Who we are. JDS consists of a government manager and contractor personnel who have an extensive set of backgrounds and skills. Many were formerly in the military with operational, intelligence, and combat support expertise; they are familiar with U.S., allied, and threat forces, units, and equipment, and with National and Defense security strategy and doctrine. The technical staff consists of computer application programmers, database developers, webmasters, and system administrators. The coordinated efforts of these functional analysts and technical staff create a powerful synergy in generating and documenting quality inputs for DoD studies.

What we've done. We have provided quality data and management support to:

- Quadrennial Defense Review (QDR) 1997
- Mobility Requirements Study 2005 (MRS-05)
- DYNAMIC COMMITMENT Beyond 2000 (DCB2K)
- Joint Weapons of Mass Destruction (JWMD) study
- JWARS development
- Quadrennial Defense Review (QDR) 2001
- Numerous smaller Joint studies and analyses (e.g., High Speed Sealift, Reserve Component Employment 2005, Tanker Requirements Study 2005, NETWARS model development, Joint Interdiction Capabilities Assessment, Coercive Campaign, Kosovo Data Collection, DoD Contingency Operations Database construction—to name a few)

What we produce. JDS helps coordinate for, collects, and provides the following DoD study-quality data for US and non-US countries:

- Military forces, current year to POM projections.
- Units
- Equipment (authorized or projected)

[1] "JAMIP models" are MIDAS, TACWAR, GCAM (ITEM), ELIST, VIC, and EADSIM.

  - ➢ *Major* equipment for non-US
  - ➢ *Detailed* equipment for US
- Personnel strengths (authorized or projected)
  - ➢ Rank structure and specialization for US
- Force flows (US only)
- Orders of battle
- A variable level of characteristics and performance (C&P) data for platforms and weapon systems (e.g., radar cross sections, weapons effectiveness, speeds, ranges, type of guidance systems, etc.)

JDS normally does NOT provide "engineering level" data (e.g., equipment component parts specifications, fluid flow rates, temperatures, voltages, etc.).

Our customers. JDS customers can be any DoD organization—the Office of the Secretary, the Joint Chiefs of Staff, the Services, the Commanders-in-Chief of the Unified Commands, Defense Agencies, etc.

The JDS Study Support Process

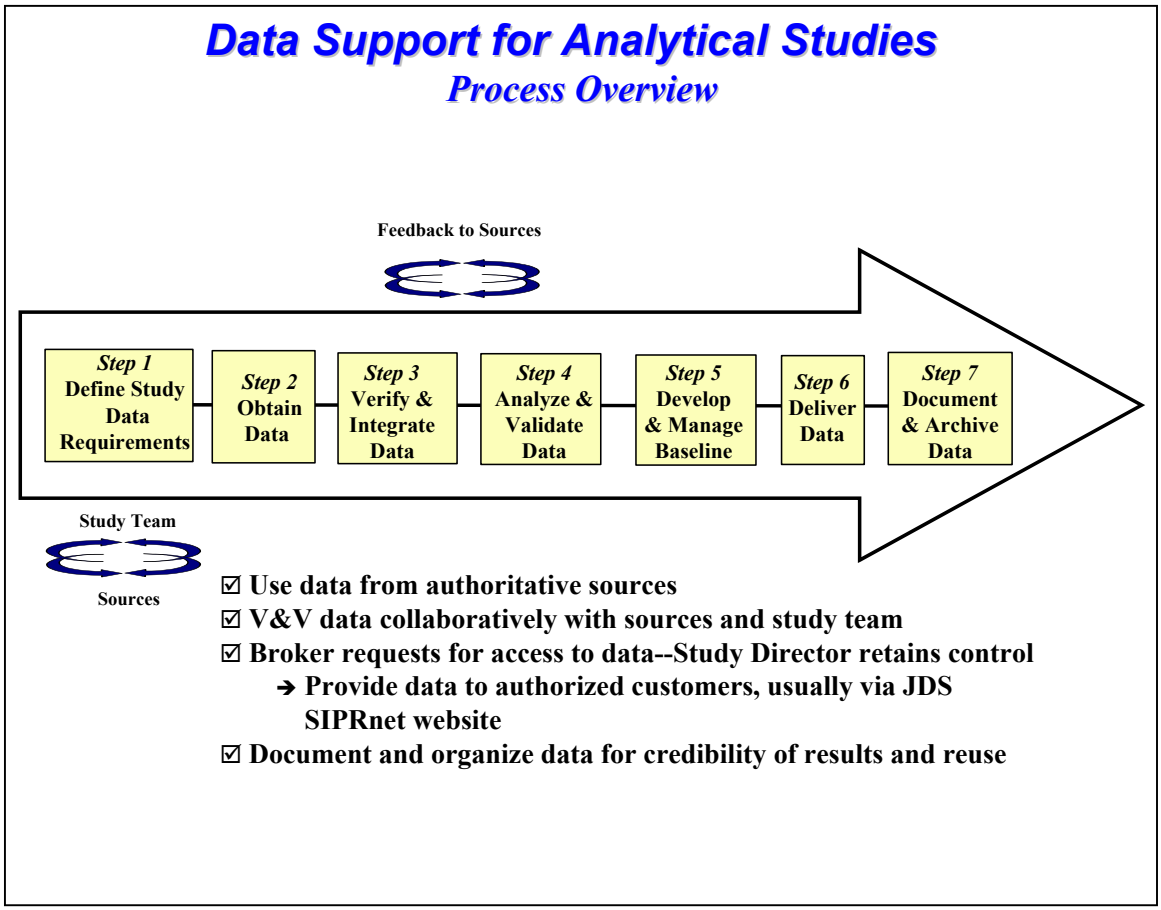


Figure 1 – Process overview

Figure 1 outlines the process Joint Data Support (JDS) uses to support Department of Defense (DoD) analytical studies. There are 7 steps, which can be tailored to meet the requirements of each study:

1. *Define study data requirements.* The product of this step is an understanding by all concerned of the nature of services JDS will provide in support of the study, and detailed knowledge of data requirements by all concerned. This step requires a great deal of interaction among the Study Director, modelers, JDS, and other stakeholders in the process.

2. *Obtain data.* JDS works with data providers to capture the data required for the study. This step includes the capture of information concerning the source data for input into the JDS Metadata Repository (MDR – under development), as well as potential storage of the source data in the JDS Operational Data Store (ODS–also future development), otherwise known as a "data warehouse." Figure 2, below, shows the anticipated relationships among the Data Warehouse, the Metadata Repository, and Data Marts.

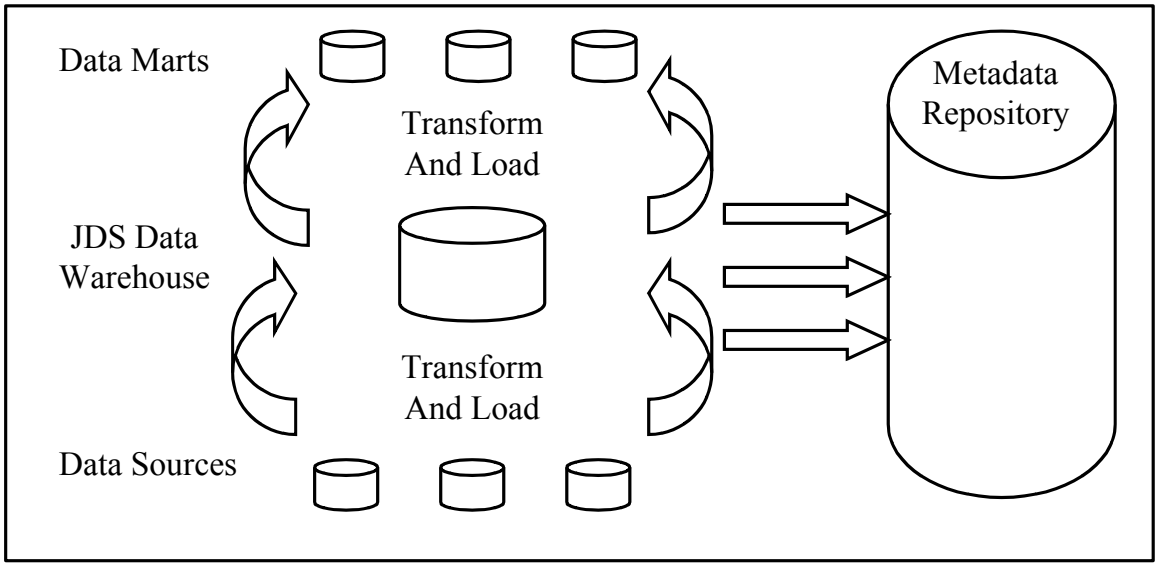


Figure 2—Relationships among Data Warehouse, Metadata Repository, and Data Marts

3. *Verify and integrate data.* This process, which is mostly automated, checks the data for consistency in accordance with business rules. These rules are established based on guidance from the Study Director, the requirements of simulations used in the study, and by JDS analysts. JDS analysts work closely with the study team to coordinate business rules. In many cases, JDS reviews business rules violations with the study team so approved corrections can be

made. Integration refers to the process JDS undertakes to pre-process data and transform them into a consistent format for further analysis.

JDS never alters data (in substance) without the owning organization's knowledge and approval. If JDS notes a discrepancy, and the data provider declines to make a correction, JDS will note the discrepancy in its report to the Study Director, but leave the data unchanged. The Study Director, in consultation with the study team and data providers, has authority to modify data and accepts all responsibility for doing so after they have been provided by JDS.

4. *Analyze and validate data.* JDS analysts further process the verified data using state-of-the-art analytical tools and subject-matter experts to ensure the data represent real-world entities appropriate for their intended purpose or an expected range of purposes, consistent with alternative sources, doctrine, etc. DoDI 5000.61 puts data validation in the context of its suitability for use in models and simulations, hence the data cannot be validated independently of the model(s) for which they are intended (unless the study employs no models). In this step, JDS performs consistency checks with, and ensures traceability to, sources that lead to validation and accreditation of the data by the study team.

5. *Develop and manage baseline.* JDS consolidates the results of steps 1 through 4 above into a baseline data set, with appropriate notes (including metadata and unresolved discrepancies from steps 3 and 4). This is presented to the Study Director for accreditation of the data in support of the study. JDS will transform and format the data as required to support models/simulations or other study team requirements, and document these transformations.

6. *Deliver data.* The preferred means of data delivery is via the JDS secure (SIPRnet) website. This facilitates configuration control, access control, statistical analysis of use of the data, etc. JDS will post to its website any data desired by the Study Director—preliminary input data, model output data, study artifacts (e.g., study plan, pertinent briefings and papers), etc.—with appropriate documentation. JDS will provide data to authorized users via alternate means if they do not have SIPRnet access, require assistive technology (Americans with Disabilities Act), or for other reasons.

JDS does not "own" the data it manages – the sources and Study Director do. Except where JDS draws data from open or community sources, JDS will not release data while a study is in progress unless directed by either the data source (for its own data only) or by the Study Director. When the study is completed, JDS will only release data as directed by either the sourcing organization, or the organization sponsoring or directing the study. (Note that "open source" data release requires no special permissions, of course.)

7. *Document and archive data.* JDS provides long-term storage. JDS will include appropriate metadata with data sets to ensure the context and constraints of the data are present along with the data sets themselves. Upon completion of the study, after an appropriate amount of time, JDS will remove the data from the JDS website and archive the data and study artifacts on permanent media.

Table 1, below summarizes steps 1-7 of the JDS study support process.

Step #	Step description	Lead / Assist (L/A)	Documentation
1	Define study data requirements	L: Study Director A: JDS, modelers, study team	• Tab A— Joint Data Support Data Request Questionnaire helps define requirements • Tab G—Sample Memorandum of Understanding (MOU) is the major product of Step 1
2	Obtain the data	L: Study Director A: JDS, data sources	• Data call issued by Study Director, with JDS assistance • Table 2—Source data metadata, prepared by JDS with assistance from data sources
3	Verify and integrate the data	L: JDS A: Data sources	• Listing of unresolved discrepancies, if any, combined with any unresolved validation discrepancies from Step 4, posted together with data sets.
4	Analyze and validate the data	L: JDS A: Data sources	• Listing of unresolved discrepancies, if any, combined with any unresolved verification discrepancies from Step 3, posted together with data sets.
5	Develop and manage the baseline	L: JDS, Study Director (accreditation) A: Data sources, modelers, study team	• Table 5 —Transformation Metadata (JDS, with data source and modeler) • Tab H—Data accreditation memorandum (Study Director, with JDS, modeler, and study team assistance)
6	Deliver the data	L: JDS A: Study Director, users of data	• Access list and release instructions to JDS (Study Director) • Data files, discrepancy/caveat notes, metadata files, study artifacts posted to JDS SIPRnet website (JDS) • Usernames/passwords and navigation instructions to users (JDS)
7	Document and archive the data	L: JDS	• Permanent storage archive, containing: ➢ Data sets ➢ Download log ➢ Metadata files ➢ Discrepancy/caveat notes ➢ Other study artifacts

Table 1—JDS Study Support Process Summary

A detailed description of each of the steps of the study support process follows.

Joint Data Support Study Support Process

General

Assumption. The steps described below assume comprehensive, start-to-finish JDS data support for a major DoD or Joint study effort. This paper primarily refers to the provision of *input* data (and associated metadata) for models, simulations, and studies, but JDS can and does involve itself with other forms or aspects of data (output data characterizations, validation data development, quality assurance of hard-coded data, provision of common databases, etc.).

Smaller efforts. Often, however, all that is required – usually to support smaller studies, quick-turn, or *ad hoc* analyses – is reuse of "off-the-shelf" data collected by JDS for a different purpose, or resident in the JDS archives.

Reuse of data. Organizations wishing to reuse data in the JDS repository or on the JDS SIPRnet website, including organizations that formerly received JDS data for a completed study, must make their desires known to JDS, JDS will ask the organization to complete a Data Request Questionnaire (Tab A), then JDS will forward the request to the approving authority via the appropriate cover memorandum (Tab B). Once the approving authority grants the release request, JDS will take appropriate action to deliver the data to the requestor. See Tab C for a graphical description of the reuse permissions process.

Intermediate situations. Often a data requirement will fall somewhere between simple reuse of data and a full-scale study support effort. In such instances JDS will work with the Study Director to establish a *tailored* version of the 7-step process below.

Scope. The steps below describe the interaction of JDS with external customers. Detailed *internal* JDS processes associated with these steps are at Tab D.

Future enhancements. Initiatives are underway to provide DoD a routine, systematic flow of certain US and non-US data. While it is unlikely that these initiatives will ever completely replace the need for tailored data calls to meet specific study or analysis requirements, they will be effective in reducing the turbulence and time required to populate study data sets. Additionally, development of the ODS will semi-automate the preparation of study data sets—drawing on both off-the-shelf data (data marts from the ODS), plus data developed especially for the study—again reducing the difficulty and time required. Tab E provides an overview of the process when these processes and data warehouse are fully operational.

Roles and missions of key players. A listing of the tasks of the various participants in the JDS study support process is at Tab F.

Step 1—Define study data requirements

This is one of the most important steps in the process.

Importance of this step. When the Study Director, JDS, and other stakeholders thoroughly understand the study's data requirements and the nature of the services JDS is to perform in support of the study, the entire effort will flow more smoothly. Tab A (JDS data request) serves as an initial checklist for helping define data requirements.

Pitfalls! On the other hand, when there is incomplete understanding of the data and the roles of the players, time must be expended later in the study to remedy the effects of these misunderstandings on the credibility of any data products. Hence the credibility of the study itself may suffer.

Include JDS early! JDS should be brought into study planning in the earliest stages, and should be present at all major progress meetings.

JDS representatives became adjunct members of the Study Directors' staffs for the Mobility Requirements Study 2005 (MRS-05) and DYNAMIC COMMITMENT Beyond 2000 (DCB2K) efforts, providing consulting services on data and data support "real time" for the Study Director and the study participants. This included providing JDS members as consultants to the Red and Blue CONOPS teams, among other activities.

JDS representatives should meet early and often with:

- the Study Director and his/her staff
- modelers, if models and simulations are to be employed in the study
- representatives of the sourcing organizations (e.g., Service points of contact)

These meetings should be undertaken with a view toward gathering enough information to generate a memorandum of understanding (MOU) between the JDS Director and the Study Director regarding JDS services and study data requirements. A draft MOU is at Tab G.

Step 2—Obtain the data

Often off-the-shelf data sets are inadequate. Although JDS frequently requests and receives various databases from Defense sources, some on a routine periodic distribution basis, these databases are not always suitable for specific study purposes for several possible reasons:

- data designed for a different purpose; application to another study would be inappropriate
- not the most current data available
- assumptions/constraints/etc. not documented
- gaps and errors in the data
- incomplete analyst understanding of the data due to lack of opportunity to generate and review the data

Thus, it is frequently necessary to create entirely new data sets to support a new study.

For example, the Mobility Requirements Study 2005 (MRS-05) required each Service to create databases similar to a Time Phased Force Deployment Database (TPFDD) appropriate for specific scenarios, using forces, units, and equipment (FUE) data projected to be present in the Department in 2005. In concert with JDS analysts and developers, this required the Services to:

- **develop expertise in creating TPFDDs, a function infrequently performed by a Service staff, and**
- **create a TPFDD using *outyear* data.**

Tasking letters to the Services specifying the data required came from the Office of the Secretary of Defense (OSD) and the Joint Staff, not from JDS.

Establishing data requirements. JDS personnel can—and should—work in collaboration with study team and modeling and simulation analysts to provide recommendations to the Study Director about the data requirements for the study, to include identification of the data sources—the Study Director can then send the data call to these sources.

The Study Director has the hammer! JDS does not have the authority to require that sourcing organizations, such as the Services, provide special data to support Departmental studies and analyses. That authority lies with the Department-sponsored study and its Study Director.

JDS analyst interface with sources. The frequent interaction between the JDS analysts and data sources assists them in providing quality study data and metadata within the timeline specified by the Study Director, in the format required by the

models/simulations employed in the study (or in specified formats if the study does not use simulation technology).

MRS-05 examples:

- **JDS analysts found gaps in intelligence data, provided submissions for intelligence validation, and helped format intelligence products into model useable and model ready forms.**
- **JDS analysts and programmers assisted one Service in the creation of a TPFDD from scratch, with JDS transforming Service-provided data into the correct format.**

Metadata. JDS analysts will document information about the source data. Table 2 below provides a typical listing of source metadata requirements. Metadata documentation allows JDS analysts to fully describe the various sources used as well as any transformations performed on those data. This record is available to end-users of the data in order to satisfy needs for traceability and validation of transformations.

Table 2—Typical analyst inputs concerning the source data[2]

Data Element	Description
Source_Name	Title of the data source (e.g., Country Force Assessment—Country X, etc.)
Originator	Data producer (e.g., National Ground Intelligence Center, etc.)
Data_Set_Prod_Stat	Data Set Production Status (Interim, Final, Draft)
Data_Year	Year represented by the data
Date_prepared	Date the data set was released
Access_constraints	Restrictions, limitations, and legal prerequisites for accessing the data set
Use_constraints	Restrictions, limitations, and legal prerequisites for using the data set
MD5	MD5 Checksum (MD5 is software that conducts a checksum on a data file. The checksum would be used to "fingerprint" the source data set.)
Analyst role	Role (Functional Analyst, JDS POC, JDS Technical Analyst, JDS Director)
AnalystFName	First Name
AnalystMI	Middle Initial
AnalystLName	Last Name
AnalystUnclassemail	E-mail
AnalystClassemail	E-mail
AnalystPhone	Phone
AnalystFax	FAX
Classification	Security Classification
Declassify_Instructions	Declassification instructions
Classified_by:	Classified by:
Declassification_Date:	Declassification Date
Control_Markings	Control Markings
Release_Markings	Release Markings
Downgrade_Instruction	Downgrade instructions

Data receipt and 2-pronged attack. Sourcing organizations provide their data to the appropriate JDS analysts, who simultaneously do two things with the data:

[2] This listing may change as the JDS Metadata Repository (MDR) design is improved. This listing is illustrative.

- hand off a copy of the source data to the JDS Information Technology (IT) Team, along with applicable business rule checks that lend themselves to automation, and
- commence analysis and validation checks (see step 4)

Future development—JDS data warehouse. JDS is in the process of developing the Operational Data Store (ODS) (or "Operational Data *Factory*"). When fully developed, it may be possible in many instances to derive "data marts" from repository data which will meet study requirements with or without modifications, rather than have data sourcing organizations prepare raw data sets from scratch. ("Data marts" are subsets of data contained in the ODS, formatted and tailored to meet study/model requirements.)

The ODS allows JDS to place source data sets in one centralized repository, with the benefit of verification, integration, and transformation having been applied to the sources. It is then possible to derive integrated extracts from this repository that are more consistent and of higher quality than would otherwise be possible drawing from individual sources. The ODS also facilitates identification of synergies among apparently disparate sources.

Figure 3, below, shows the basic process, as anticipated.

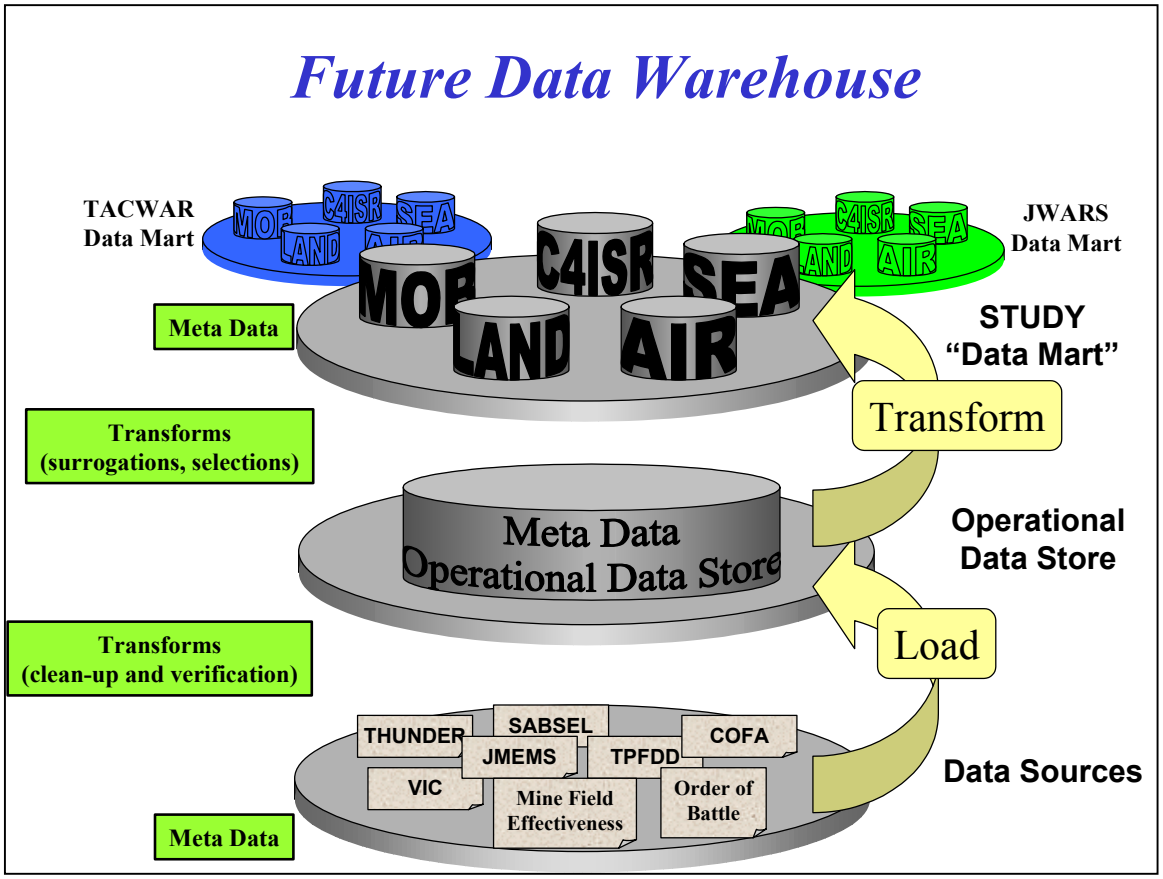


Figure 3—Operational Data Store

Metadata. Metadata represents the specific information related to the data at the appropriate level. Metadata are data about data.

The purposes of collecting metadata include:

- Ensuring the recording of the context and constraints of the data
- Providing a full description of the sources and transformations performed
- Satisfying user needs for traceability and validation
- Capturing security information
- Providing information about the data analysts involved in the process
- Preventing the expenditure of unnecessary time on re-collection of data from sources used repeatedly
- Preventing re-development of data transformation processes when the same model is used repeatedly

Metadata can include but are not limited to data dictionary-type information (table, column names, data types, lengths, definitions, etc.), pedigree information (quality indicators, date of data timeframe covered, etc.), security type information (releasability, use constraints), etc.

In general, the right side of Figure 3 illustrates process and product—the "external" view. The left side represents what is gathered and managed "internally."

The two metadata boxes indicate that the two ends of the spectrum of finished products (raw data—someone else's finished product—at the bottom, JDS's finished product at the top). Each product has descriptive information associated with it that JDS will track and manage.

Other initiatives. There are initiatives underway within the Department which are attempting to identify certain recurring data requirements based on study and/or scenario needs, and to synchronize the data production to meet those needs in a timely fashion. When this process is fully mature, sourcing organizations will provide their data on a routine, periodic basis to JDS for inclusion in the ODS, and JDS will draw out data marts from the ODS for use in studies or particular analyses.

This process will reduce the turbulence associated with the current "episodic data provisioning requirements" of the Department. All the steps of this JDS study support process will remain in effect and be required for each effort, and it is unlikely that the requirement for tailored, study-specific data will be completely eliminated. However, Step 2 ("Obtain Data") should become less "painful" for all concerned as the system matures, because data provisioning and refreshment for certain scenarios will occur on a scheduled basis.

See Tab E for more detail.

Step 3—Verify and integrate the data (conducted in parallel with Step 4)

> ***DoD Instruction 5000.61:*** **"*Data verification* is the process verifying the internal consistency and correctness of data." In other words, "Did I build the database right?"**

Business rule checks. The JDS Information Technology (IT) and Data Acquisition and Analysis (DAAT) Teams iteratively perform automated "business rule" checks on the data. Table 3 contains examples of activities contained within this step.

Table 3 Verification/integration activities (examples)

Pre-process the data as required (format, order, align, convert, size, etc.)
Check for allowable values
Check for internal consistency
Check for missing mandatory data
Check for duplicates and double counts
Ensure that detail rolls up to match aggregate values properly
Pre-process data for the Online Analytical Processing (OLAP) tool

Some specific examples of verification checks used on the TPFDDs of MRS-05 included:

- **Screening for missing values in mandatory fields**
- **Checking for duplicate movement requirement records, by Unit Line Number (ULN)**
- **Ensuring all deploying units in the TPFDD force table had corresponding equipment in the Type Unit Characteristics (TUCHA) table**
- **Comparing transportation mode and source code pairings to ensure consistency**
- **Comparing cargo category and transportation mode to ensure consistency (for example, "not air transportable" being coded for air transportation)**
- **Identifying inconsistent unit availability and arrival dates (for example, required delivery date at final destination occurring before availability date at staging base)**

Interaction with sources. JDS reports discrepancies found to the data source, with recommendations on how to resolve the discrepancy.

Discrepancy documentation. If the source is unable or unwilling to modify the data, JDS will document the discrepancies found, and post the discrepancy list together with the processed data sets upon completion of Steps 3 and 4 as part of Step 5.

For example, in MRS-05, one Service declined to change data that conflicted with other authoritative sources, believing the special data it provided to the study were more current and correct than the data it had previously provided to JDS for validation checks.

Step 4—Analyze and validate the data (conducted in parallel with Step 3)

***DoD Instruction 5000.61: "Data validation*: The process of validating that [data] represent real-world entities appropriate for their intended purpose or an expected range of purposes." In other words, "Did I build the right database?"**

Validation checks. Table 4 gives examples of checks JDS analysts perform, in their mission to perform consistency checks and provide traceability to sources that lead to validation and accreditation of the data by the study team.

Table 4—Validation checks

Compare and reconcile U.S., enemy, and allied forces, units, equipment, and personnel data with other qualified source data
Compare data submission with doctrine or guidance (Defense Planning Guidance [DPG], DPG Illustrative Planning Scenarios, Service doctrine, etc.) to ensure consistency. For example, do the data show that Army Division X arrives on or about Day Y, as per the DPG Illustrative Planning Scenario (IPS)? Does Carrier Battle Group Z contain all the subordinate units (air wing squadrons, cruisers, destroyers, submarines, etc.) specified in Navy guidance for CVBG composition?
Assess the right/reasonable mix of data (balance, appropriate level of resolution). For example, do some of the data reflect units down to the squad level while other portions of the data aggregate up to brigade level? Do the data show that the daily throughput exceeds the maximum capacity of the port?
Ensure that home station, mobilization station, and port of embarkation are logical for the particular scenario involved.
Ensure that mobilization delays for reserve component units are in accordance with existing mobilization plans and that mobilization station overload does not occur.
Ensure there is appropriate delay introduced into unit movements to account for move between home station and mobilization station, training at mobilization station, packing and processing at mobilization station, movement to the port of embarkation, etc.

Some examples of validation checks used in MRS-05:

- **Comparison of force moves with DPG IPS flow**
- **Comparison of Service TPFDD units to the Services' resourced force databases; identify discrepancies in units, station names, personnel strength, etc.**
- **Comparison of Service TPFDD units to the Services' equipment databases to ensure consistent equipment counts**
- **Compare threat force submissions with DIA and Service Intelligence Center sources**

OLAP (online analytical processing). If appropriate for the data involved and the time available, the JDS Director will consider the implementation of OLAP technology.

OLAP adds powerful query, analysis, and reporting functionality to the data provided. By transforming data into a multi-dimensional database, OLAP permits users to easily and selectively extract and view data from several perspectives. The resulting data-mining capability unlocks stored information and permits discovery of previously unknown relationships and knowledge of value to the study.

JDS has experience and expertise in configuring OLAP systems. Typically, JDS can provide a single intuitive interface usable with both LAN and Web-based clients.

Performing complex querying and analysis with an OLAP tool requires minimal training. The learning curve is small so users become instantly productive. Additionally, all analysts working on the study with this tool share the same data file formats, data models, and central repository.

Here are a few examples from MRS-05 of validation checks that lent themselves to OLAP query analysis:

- **Rollup of total number of passengers, short tons, and measurement tons destined for each theater. Consistent with the DPG and with port capacities?**
- **Identification of units earmarked for each theater, and their required delivery dates. Are these forces and arrivals consistent with the DPG IPSs?**
- **Which component (Active, Reserve, Guard) do these units belong to?**
- **Are there unit names without Unit Identification Codes (UICs) or UICs without associated unit names?**
- **Do in-place unit records contain (when they should not) routing data?**
- **Do TPFDD cargo short tons at level 2 detail equal rollups from level 4?**
- **Are dates out of order (e.g., ready-to-load date later than required delivery date at final destination)?**
- **Are unit locations and origins/mobilization stations consistent?**

Discrepancy documentation. The appropriate JDS analyst interfaces with the data source point of contact to resolve discrepancies found, modifying the data with approval from the source point of contact. If the source is unable or unwilling to modify the data, JDS will document the discrepancies found and post the discrepancy list together with the processed data sets upon completion of Steps 3 and 4 as part of Step 5.

Step 5—Develop and manage the baseline

Transformations and formatting. Upon completion of Steps 3 and 4, JDS will transform/format the data for study models/simulations, and/or in a manner useful to the study team. JDS will document any transformations (making entries to the MDR, once fully developed). Table 5 is a typical table of fields for transformation metadata capture.

Table 5 —Transformation Metadata[3]

Data Element	Description
Transformed file name	File name of data file which has been transformed
Transformation_Type	Type of transform from source file to transformed file (1-1, algorithm, analyst input)
Processing_Notes	Information on transformations or other relevant data manipulations
Project_Name	Name of the study or analysis associated with the target file
Description	Summary of the data set – especially useful for outside consumers of data
Keyword (1…n)	Searchable key word(s)
Category	Category of transformed data (M&S, Study/Analysis, Raw Source)
Subcategory	Subcategory of transformed data (TACWAR, JWARS, ITEM, JICM, EADSIM, VIC, Other)
Data_year	Year represented by the data
Location	Geographical descriptor (NEA, SWA, Europe, etc.)
Country	Country of allegiance
Distribution_Format	Format of the transformed file (e.g., Excel 97, Delimited Text, etc.)
MD5	MD5 Checksum (MD5 is software that conducts a checksum on a data file. The checksum would be used to verify the output data set.)
AnalystFName	First Name
AnalystMI	Middle Initial
AnalystLName	Last Name
Classification	Security classification
Declassify_Instructions	Declassification instructions
Classified_by:	Classified by:
Declassification_Date	Declassification date
Control Markings	Control markings
Release_Markings	Release markings
Downgrade_Instruction	Downgrading instructions

DoD Instruction 5000.61: "Accreditation: **The official certification that a model, simulation, or federation of models and simulations and its associated data are acceptable for use for a specific purpose." In other words, "Should the data be used?"**

Accreditation. Upon completion of Steps 3 and 4 and formatting/transformation, the JDS analyst leading the JDS support effort for the study will brief the Study Director and JDS Director on the completion of the verification and validation effort, and on any unresolved discrepancies found by JDS. The JDS lead analyst will then recommend use of the data sets with a specific model(s), if applicable, or for study analyses. The Study Director and/or organization(s) sponsoring the study will accredit the model and

[3] This listing is illustrative. It will change as the JDS Metadata Repository (MDR) design matures.

associated data as acceptable for the purposes of the study. Validation of the combined model and data must be accomplished prior to accreditation. Tab H provides a sample memorandum.

SUMMARY OF DATA V&V CONCEPTS

Data verification – ***Did I build the database right?***

Data validation – ***Did I build the right database?***

Accreditation – ***Should the data be used?***

All lead to:

Credibility – ***Should the data be trusted in the context of the study and any models/simulations employed by the study?***

Step 6—Deliver the data

Access. The Study Director will provide JDS a listing of specific individuals to be granted access to the files on the JDS SIPRnet website. This listing will normally include the following individuals:

- Study Director
- Study team members
- Modelers
- Data source organization points of contact
- JDS Director
- Appropriate JDS analysts and IT personnel

Data required from each person having access to the files[4]:

- Name
- Organization
- Commercial telephone number
- SIPRnet e-mail address

Posting of baseline data. JDS will post the files to the JDS SIPRnet website (http://jds.pae.osd.smil.mil), displaying filename, file descriptor, and non-dissemination banner. JDS will implement access controls as agreed to by the Study Director. Additionally, JDS will maintain, as well as potentially post for distribution, various metadata, discrepancy notes, and additional information related to the data set, as appropriate. Furthermore, JDS will implement, as desired by the Study Director, reporting mechanisms to allow tracking of downloads by using organizations.

[4] JDS policy is to provide download access capability to *individuals,* not to *groups.* In other words, individuals are requested not to share usernames and passwords. JDS will provide additional usernames/passwords as required and authorized by the releasing authority. The JDS Director will approve exceptions on a case-by-case basis. (Note that JDS issues usernames/passwords for data *control* purposes. *Security* of classified data is a separate issue, addressed by local user organizations. In other words, normally a username/password pair issued by local systems administrators for access to the SIPRnet ensures that the user has the appropriate clearance and need-to-know for whatever data are released to the SIPRnet community; JDS username/password pairs enforce access to specific data files according to rules provided by appropriate releasing authorities for the study in question.)

An example of a file descriptor:

(MS-Access database/Excel workbook/text file/etc.) containing the all-Service East-West TPFDD, with fields generally conforming to JOPES .b8 format. This file is classified (CONFIDENTIAL/SECRET) (and is so marked internally / but cannot be so marked internally because of the nature of the file).

An example of a non-dissemination banner:

(Note: JDS will not actually grant access permission, but will broker the granting of access permissions with the Study Director, data source, or controlling organization, as appropriate. The language in this banner is intended to direct potential users to JDS to begin the data reuse release process.)

Management. JDS will maintain configuration control of data sets posted to the JDS SIPRnet website, per general guidance from the Study Director.

JDS will post baseline data with any updates and/or excursions, or replace baseline data with a refreshed set, etc. – as desired.

JDS will notify all account holders whenever JDS posts a new or updated data set pertinent to the study.

Additionally, posting date and other pertinent information will be visible in the file descriptor on the JDS website download page.

In the case of large studies, JDS can also maintain a "What's New" or "Data News" page, if there are frequent changes to the data set and if the Study Director requests.

Security. Classification labels (e.g., "SECRET") and non-dissemination instructions will appear on web pages, in the file documents themselves where possible, and in the metadata. Where possible, these labels and instructions should appear both in the text of the document and in the header and footer.

Reuse of data. It is wasteful of resources to prepare unique data sets from scratch in support of each and every study the Department or its components undertake. Data from one study are frequently reusable in other studies, sometimes with modifications, sometimes without. It makes good management sense to reuse data whenever possible.

Study Directors wishing to reuse data must take care to ascertain that the data of another study—prepared for another purpose with all the attendant assumptions, constraints, caveats, etc.—are suitable for use in their new studies.

By the same token, organizations providing data for a specific purpose do not wish for their data to be used out of context, with potentially adverse consequences—especially when the Department might use the results of the new study to make budgetary decisions!

For example, the Services provided a huge data set in support of the Mobility Requirements Study 2005 (MRS-05). The Services stood behind these data for the purpose for which they were provided—assessing the adequacy of the Defense Transportation System in facilitating the National Military Strategy in warfighting scenarios set in the year 2005.

But, in some cases, the Services are understandably hesitant to have other Study Directors use MRS-05 data in support of studies other than mobility studies, other year scenarios instead of 2005 scenarios, etc.

The role of JDS is to act as catalyst to bring these competing interests together in a manner beneficial to all concerned.

On the one hand, JDS supports the reuse of data, where appropriate, to reduce the amount of resources necessary to prepare completely new data sets for each study. On the other hand, JDS respects the need of data providing organizations to protect their equities by ensuring that studies reusing their data do so with due respect for the context for which the data source provided the data. Study Directors and data providers may avail themselves of the services of JDS to broker arrangements satisfactory to both.

Tabs A (Joint Data Support Data Request Questionnaire), B (Sample Data Release Request Memorandum), and C (Release of JDS-held study data [process flow chart]) show the essentials of the reuse process. The following discussion amplifies the process flow illustrated in Tab C:

An organization requesting data support from JDS uses the "Joint Data Support Data Request Questionnaire" at Tab A to articulate its request. Essentially JDS needs to know: 1) the identity of the requestor and his/her government sponsor, 2) the nature of the data requested, and 3) the intended uses of the data. JDS's response to this request will typically be one of the following:

- Provision of "off-the-shelf" data from unrestricted sources
- Development of a special data set to support the requestor's needs

- Referral of the request to another agency in the case where the data requested is not of the nature of data JDS normally provides (most engineering-level data, for example)
- Brokering the reuse of data from another study
- Some combination of the above

The remainder of this discussion will concern itself with the fourth case—in which JDS brokers reuse of data from another study.

Upon receipt of a completed data request questionnaire, and evaluation that reuse of data from another study is appropriate, JDS will forward the request under a covering memorandum (Tab B) to:

- the organization which provided the source data, in cases where the requestor needs data from a single source (e.g., Navy data only—request goes to Navy)
- the Study Director of an ongoing study, in cases where the data requirement is for more than single-source data
- the organization in control of study artifacts (usually the organization that sponsored the study) in cases where 1) the study is complete, and 2) the data requirement is for more than single-source data

In all cases, JDS will make every effort to work with stakeholders to say "yes" to the requestor, if possible.

If the request goes to a single source of data, that source has the final say in whether JDS may release the requested data. If the data provider determines the data cannot be released in present form, JDS will work with the requestor and potential provider to attempt to find a "work-around," modification of the existing database, or some other solution that will both provide some level of data support to the requestor without great expenditure of resources, and ensure that the provider is comfortable with providing whatever the final product turns out to be.

In the case of active studies, the position of JDS is that the Study Director "owns" the data provided to the study, and will make informed decisions in consultation with the data providers, who are probably part of the study team. Again, however, JDS can provide resources to help with any transformations, work-arounds, etc., that will support the equities of the requestor, the Study Director, and the data provider.

The somewhat more difficult case is one in which the study has been completed. This is because, over a certain period of time, people who worked on the study and were intimately familiar with its nuances, and with the idiosyncrasies of the underlying data, begin to disappear due to transfers, reassignments, retirements and separations, etc. It seems intuitively more likely to use data inappropriately after the passage of time, as people begin to lose "ownership" and "corporate knowledge" of the study data sets.

In this case, JDS will forward the release to the organization that controls the study artifacts (usually the organization which sponsored the study), with courtesy copy

to the organizations that provided the requested data. JDS requests that the controlling organization discuss the data release with the data providers before approving the data release request, and achieve consensus.

If the controlling organization chooses to approve the request, but the source organization has objections, JDS strongly recommends, before releasing any data, that a conference of all stakeholders be held to determine whether there might be a means of releasing the data in a form acceptable to all.

For example, if J-4 were to perform a mobility study requiring reuse of Army data from a previous study, and Army had objections to the use of the data for that purpose, for that study year, or whatever, JDS may be able to work with Army and J-4 to update or transform the data into a releasable form.

Alternatively, perhaps Army would be willing to provide a representative to J-4's study to both assist J-4 with an understanding of Army data and doctrine, and to ensure Army equities were addressed.

Bottom line: there is usually some way to reuse existing data that will also ensure representation of the data in a manner acceptable to the study sponsor, the data provider, and the data requestor.

If consensus can truly not be reached at the working level (which should be rare), it would be appropriate to elevate the discussion to a higher level of authority. The issue could be discussed at the JAMIP Steering Committee, the JAMIP Executive Committee, the Executive Council for Modeling and Simulations (EXCIMS), or other appropriate bodies, if necessary.

Mechanics of data release. JDS can control access to the individual file level for each person authorized to download data from the JDS SIPRnet website. JDS will provide usernames/passwords and navigation instructions to authorized recipients of the data via SIPRnet e-mail message.

Alternate delivery. In cases where authorized recipients do not have SIPRnet access, or for some other reason cannot receive HTTP-based file downloads via the SIPRnet, JDS will copy the appropriate files to other media (CD, JAZ, ZIP, floppy, etc.), or make them available via other protocols (FTP, e-mail, etc.) and arrange for the transfer of the data to the user, following applicable security directives.

Step 7—Document and archive the data

Advantages of JDS as archivist. Since accredited study data from JDS are considered authoritative, the Study Director or others in DoD may designate JDS as their official data repository for persons seeking data upon conclusion of a study or for internal or external audit of a study.

Archiving. JDS will archive a study when these three criteria have been met:

- The study is complete
- There have been no downloads of study data from the website in 6 months
- The JDS Lead for the study is aware of no requirements for retaining the data on the website

Upon achieving these criteria, JDS will:

- Remove study data sets from the JDS SIPRnet website
- Write the data to a permanent storage medium (e.g., CD-ROM)
- Add to the archive a listing of all individuals, by name and organization, who were granted access to the files on the website, plus download history from the log
- Add metadata and discrepancy / caveat files to the archive
- Add any other study artifacts (e.g., the study report, significant briefings or papers, etc.) which it would be convenient to store with the data sets
- Ensure that the archived files are accurate and are stored using the minimal amount of storage possible
- Make copies of the archive for authorized users desiring a copy
- Store the archive in a manner consistent with its security classification

JDS will post to the JDS SIPRnet website a "comments" file stating that the study has ended and providing information about how to gain access to the archive. This file will be visible on the JDS website for 6 months after the removal of study materials from the website.

In addition, JDS will post to the website a running file listing archived studies, including:

- The study name
- File descriptions
- Dates posted and archived
- JDS point of contact

Tab A—Joint Data Support Data Request Questionnaire

CLASSIFICATION

SUBJECT: Joint Data Support Request _____ (Date)

TO: Director,
Joint Data Support, OSD (PA&E)
1225 South Jefferson Davis Highway
(Suite 200)
Arlington, VA 22203

FROM: _____
_____
_____
_____
_____

1. ( ) Request the force data described below be provided to this organization.

2. ( ) Requestor Organization:
_____

3. ( ) Study/Wargame Simulation being supported:
_____

4. ( ) Scenarios being played:
_____

5. ( ) Simulation Model and version to be supported by the data:
_____

6. ( ) Countries requested:
_____

7. ( ) Year(s) data are requested:
_____

8. ( ) Forces requested:

a) ( ) Service: Army ___ Navy ___ Air Force ___ Marines ___ SOCOM ___ Coast Guard ____
b) ( ) Function: Air _____Ground _____Maritime _____ Space _____
c) ( ) Level: Strategic _____ Tactical _____
d) ( ) Function: Combat ____ Combat Support _____ Combat Service Support _____
e) ( ) Specific Units (List):
_____
f) ( ) If access to files on JDS website are desired, provide file names:

_____

9. ( ) Additional Remarks:
_____

_____

10. ( ) Level(s) of aggregation requested:
_____

CLASSIFICATION

CLASSIFICATION

11. ( ) Characteristics and performance data requested:
_____

12. ( ) Data sources requested:
_____

13. ( ) Data may be delivered in increments as follows:
_____

14. ( ) Data requested by (date):
_____

15. ( ) Data requested in formats:
_____

16. ( ) Requested Highest Security Classification:
_____

17. POC Information:

Name: _____ Address:_____
_____
E-Mail: _____ _____
_____
Phone Nr: _____ _____

18. Government sponsor (required):

Name: _____ Address:_____
_____
E-Mail: _____ _____
_____
Phone Nr: _____ _____

CLASSIFICATION

Tab B—Sample Data Release Request Memorandum

(Date)

MEMORANDUM FOR (Study Name) Study Director **or** (Data sourcing organization) **or** (Controlling organization [usually the study sponsor])

SUBJECT: (Study Name) Data to Support (Purpose)

(Requesting organization) requests the use of (name of study) data (specify if more constrained—e.g., "Army MRS-05 TPFDD data") to support (purpose). See enclosure (1) for details.

Request approval decision within 5 working days from the date of this letter.

The following organizations provided source data germane to this request. Recommend they be consulted before making your release decision. If a source organization objects to providing these data in raw form, and/or if you intend to disapprove this request, recommend, before making your final decision, that you contact the JDS POC below as we may be able to broker a compromise arrangement acceptable to all parties. (Insert data provider POC information and description of source data provided.)

The JDS point of contact is (Study Support Team analyst name, phone number, fax number, e-mail address).

(Name)
Director
Joint Data Support

Encl: 1—JDS Data Release Questionnaire

Approved:_____ Disapproved:_____

_____, Study Director (or source POC, etc.)

_____ (Date)

cc: (Data sourcing organization POCs, if memo addressed to organization that sponsored a completed study)

Legend (applicable to Tabs C & D)

Rectangle = Action / work

Page = deliverable or product

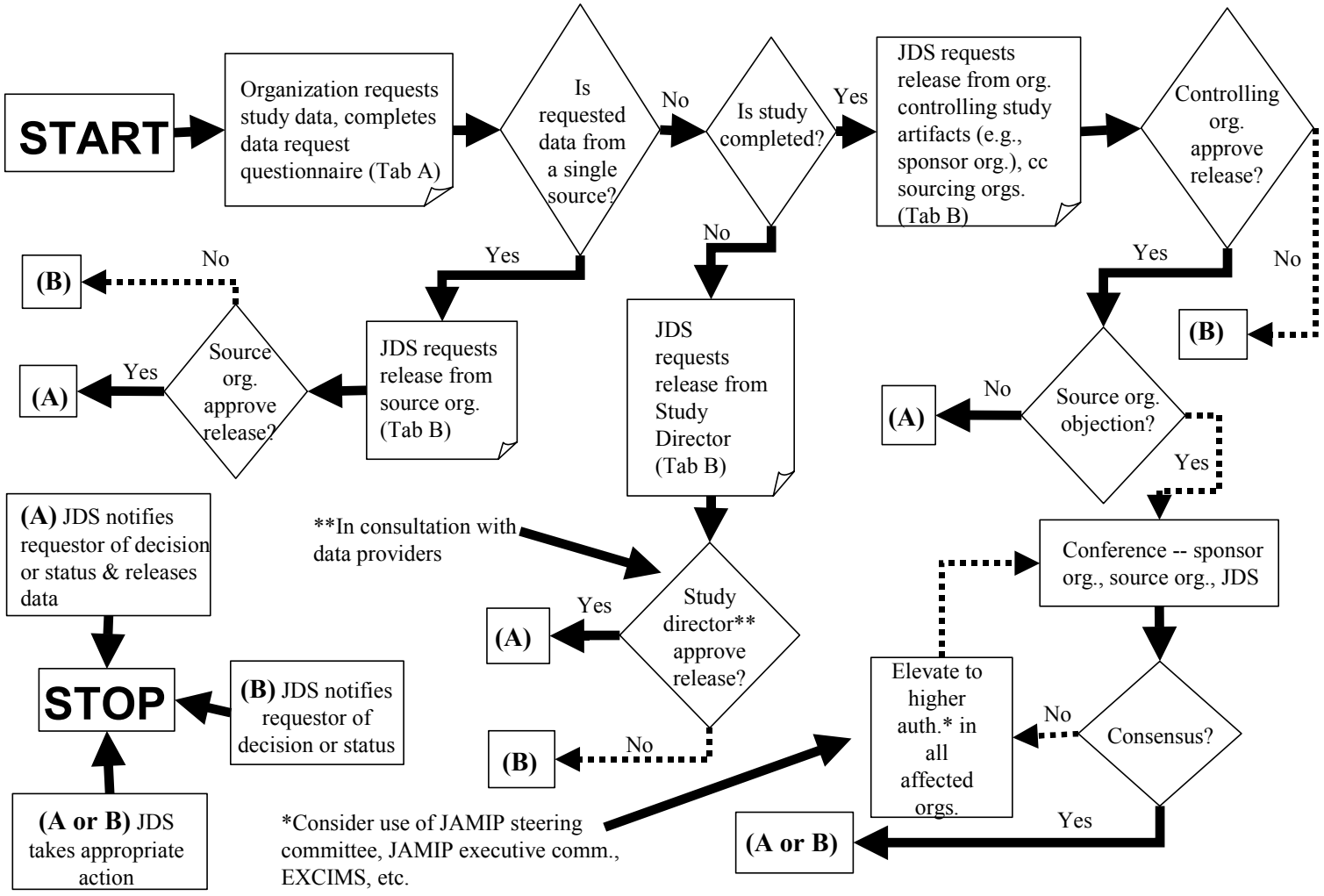
Diamond = alternative paths

Solid line = "positive path"

Ellipse = decision or direction

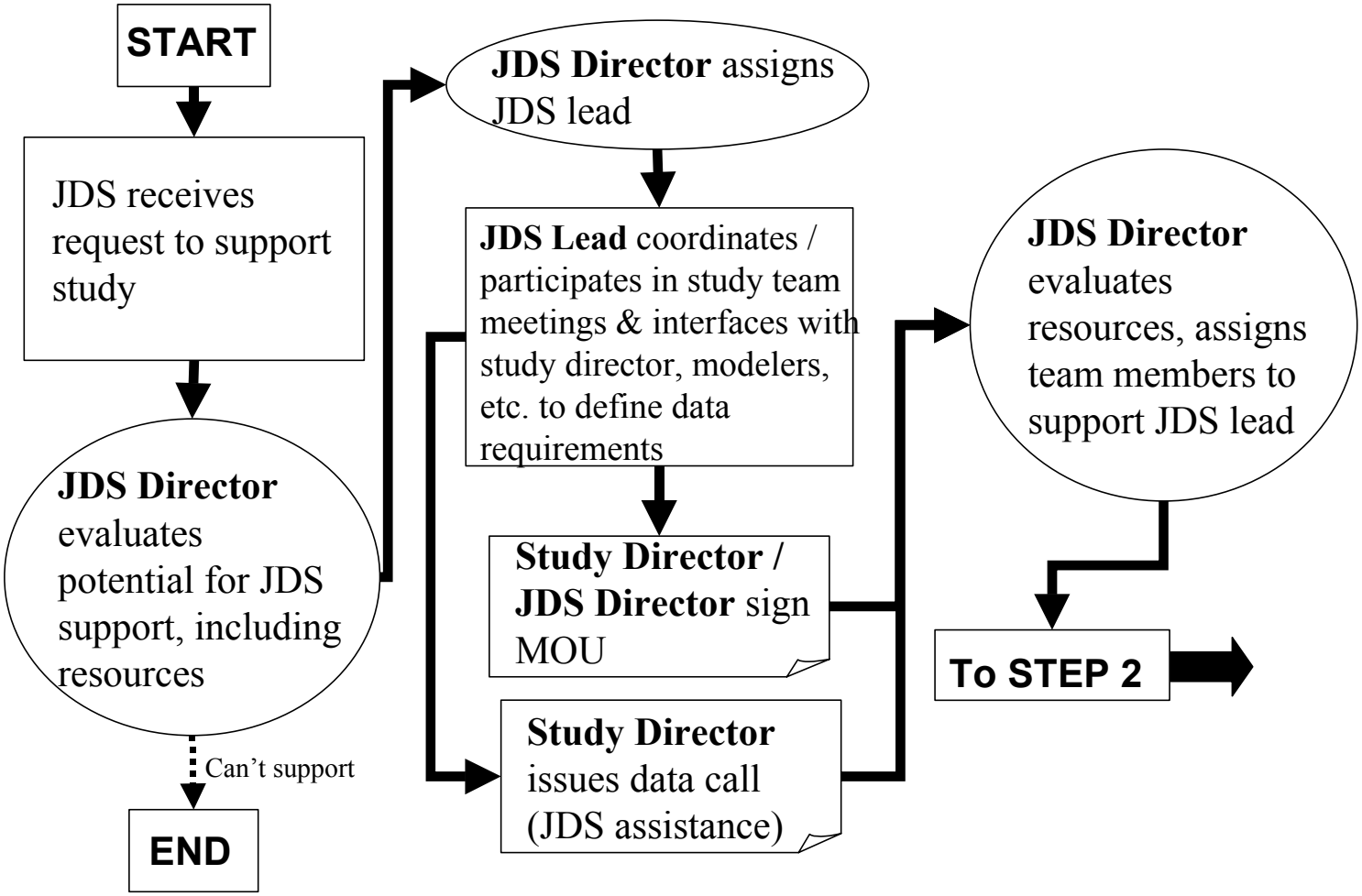
Broken line = "negative path"

Tab C—Release of JDS-held study data

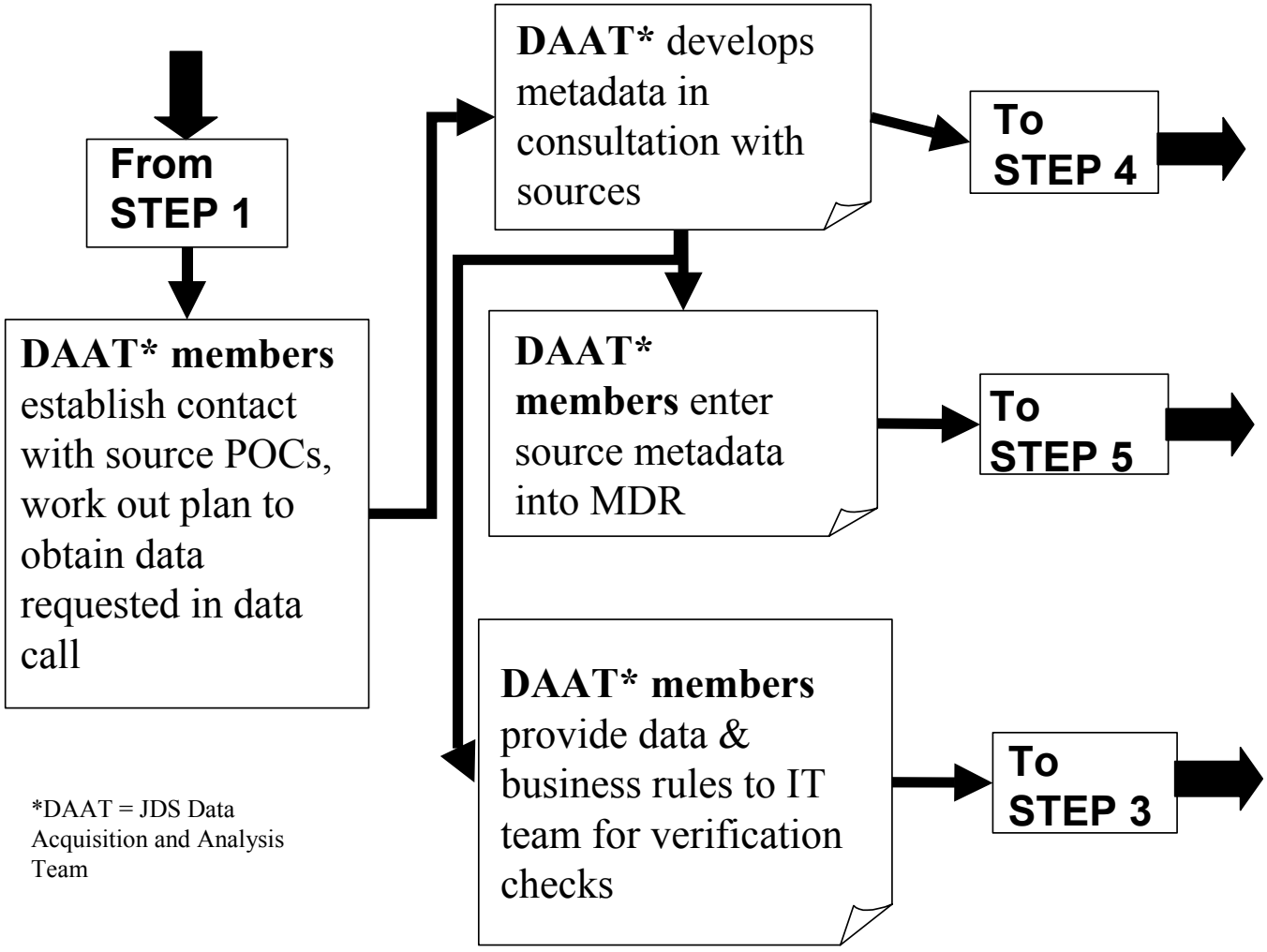


Tab D—Internal JDS Process (current)

Step 1 -- Define Study Data Requirements



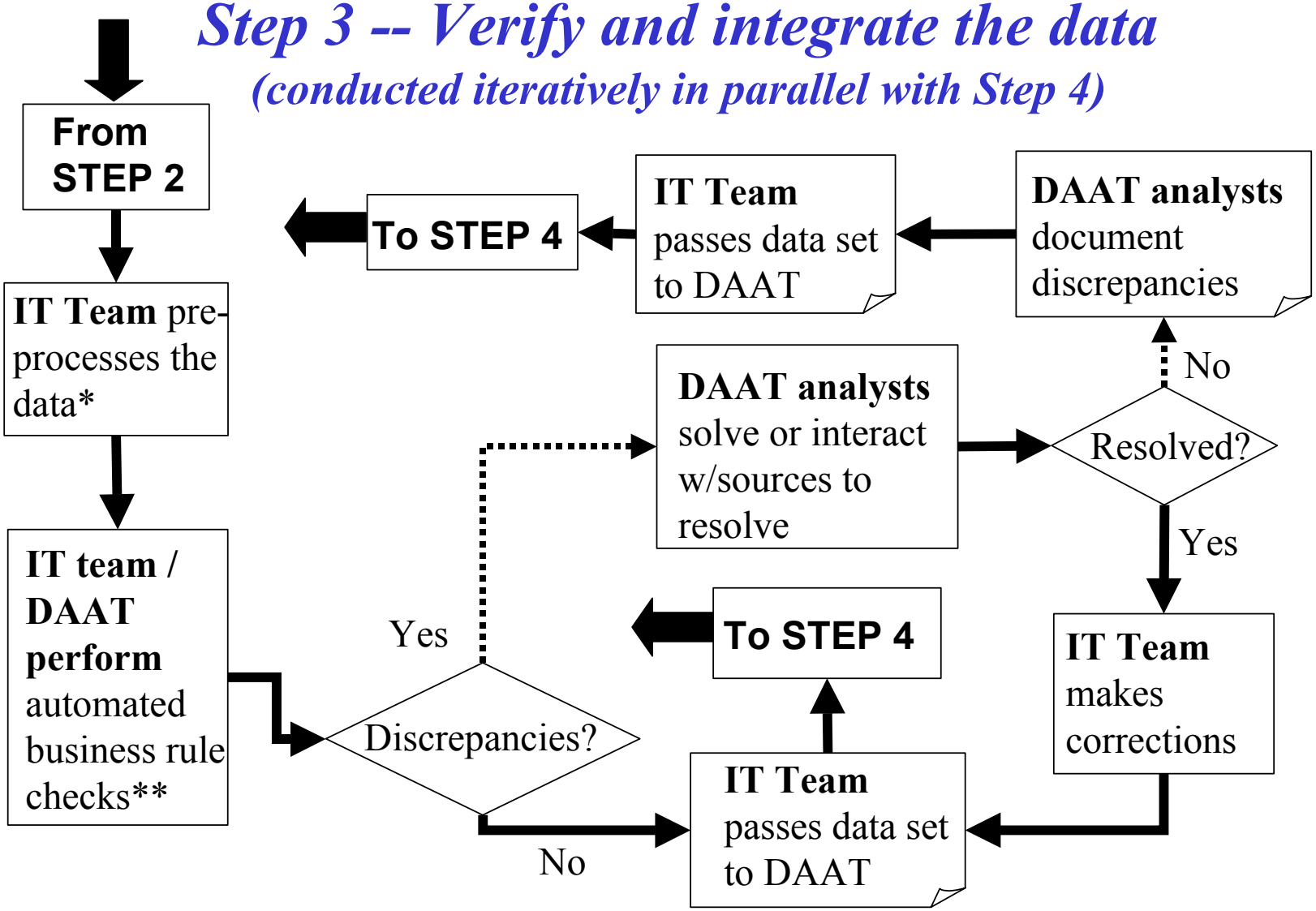
Step 2 -- Obtain Data



*DAAT = JDS Data Acquisition and Analysis Team

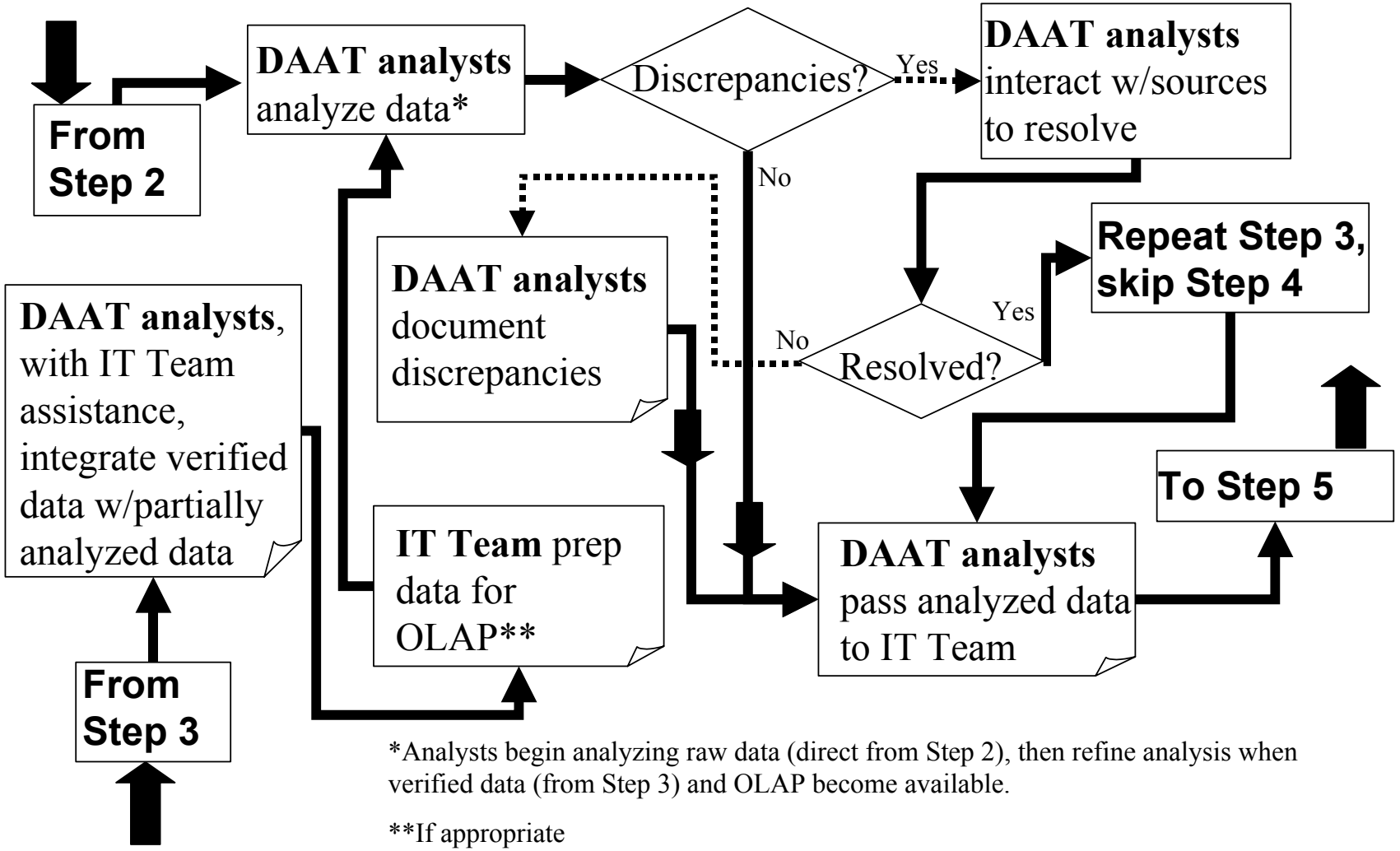
Step 3 -- Verify and integrate the data

(conducted iteratively in parallel with Step 4)



*as appropriate **allowable values, internal inconsistencies, missing data, duplicates, improper rollups, etc.

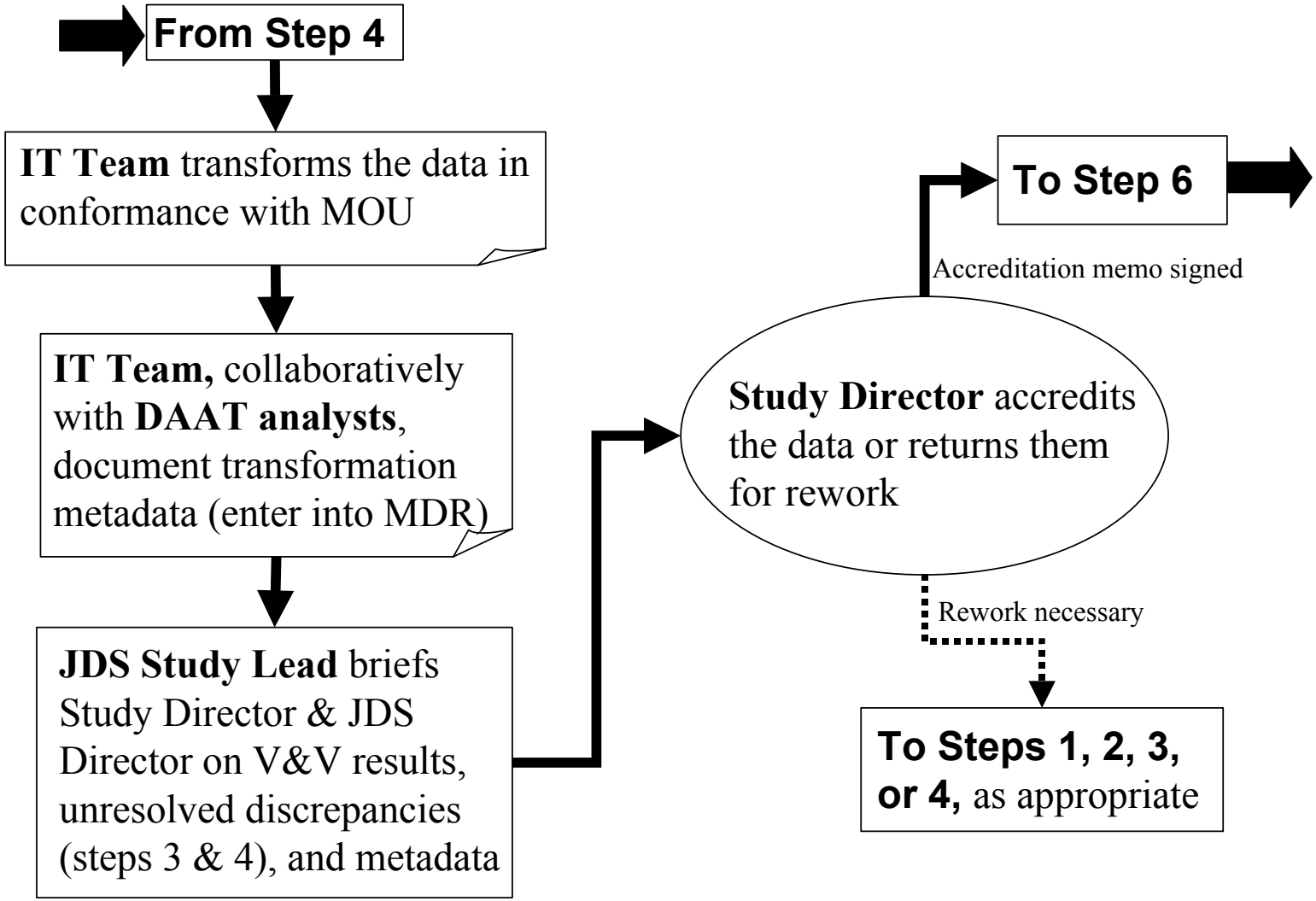
Step 4 -- Analyze and validate the data (conducted in parallel with Step 3)



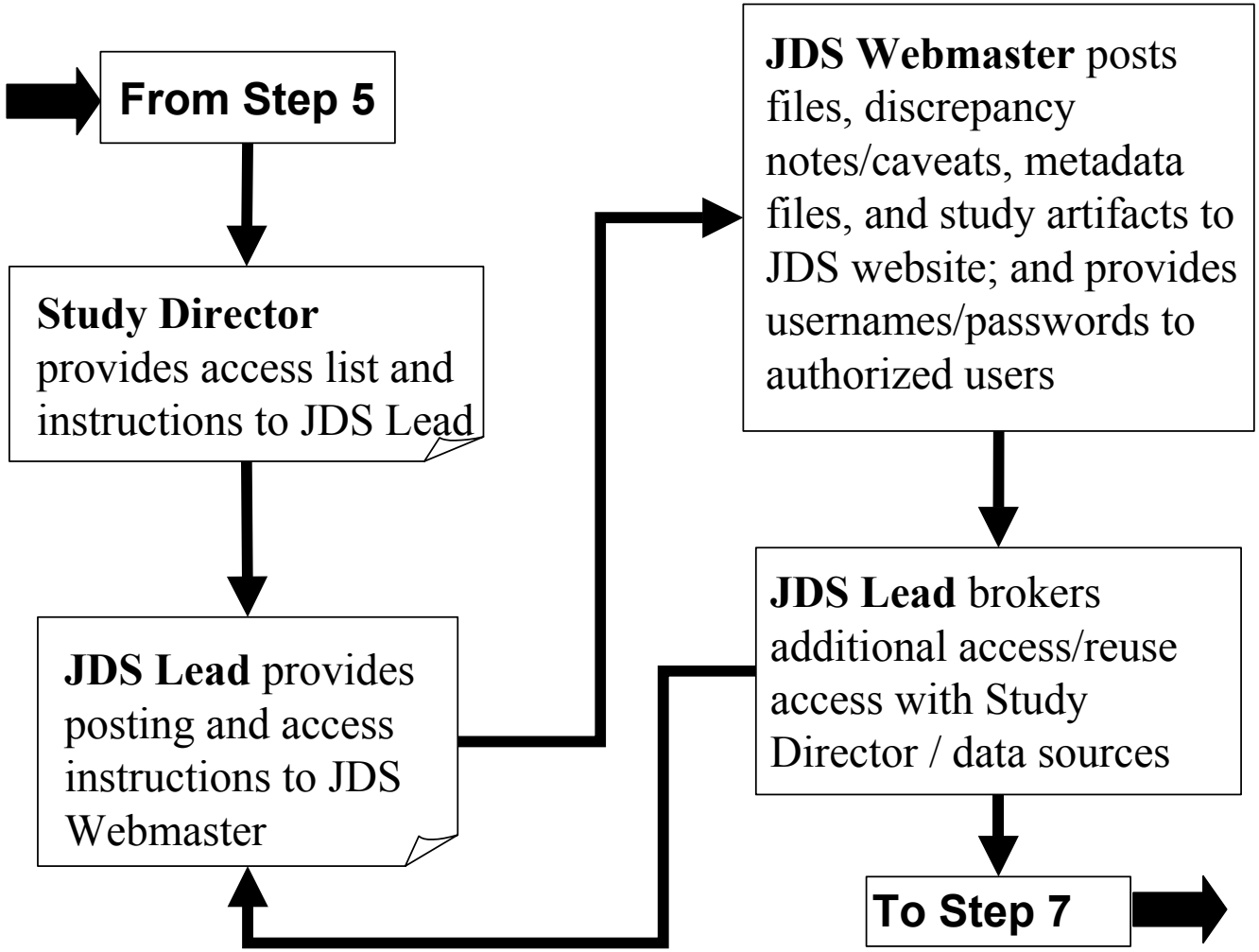
*Analysts begin analyzing raw data (direct from Step 2), then refine analysis when verified data (from Step 3) and OLAP become available.

**If appropriate

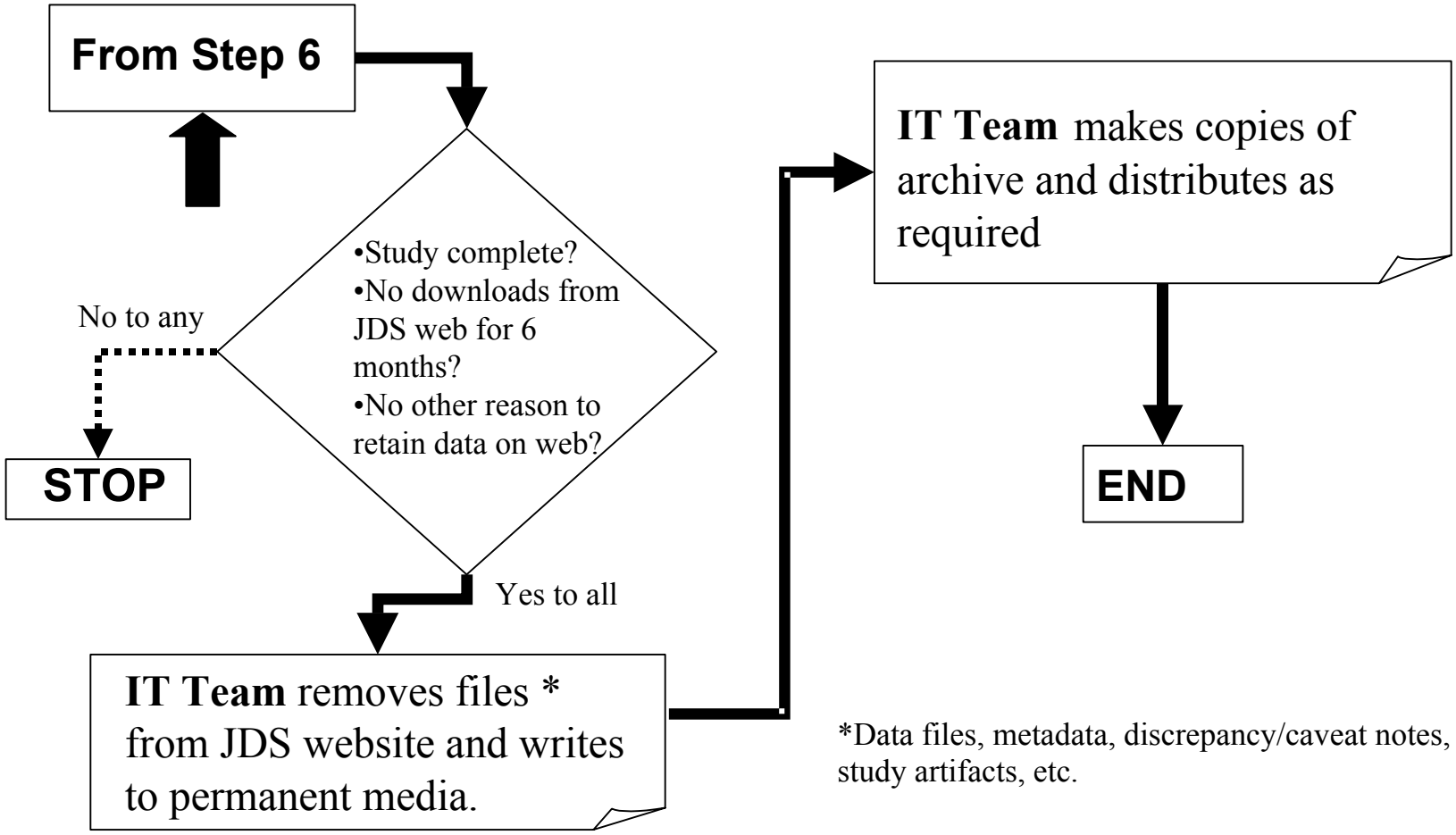
Step 5 -- Develop and manage the baseline



Step 6 -- Deliver the data



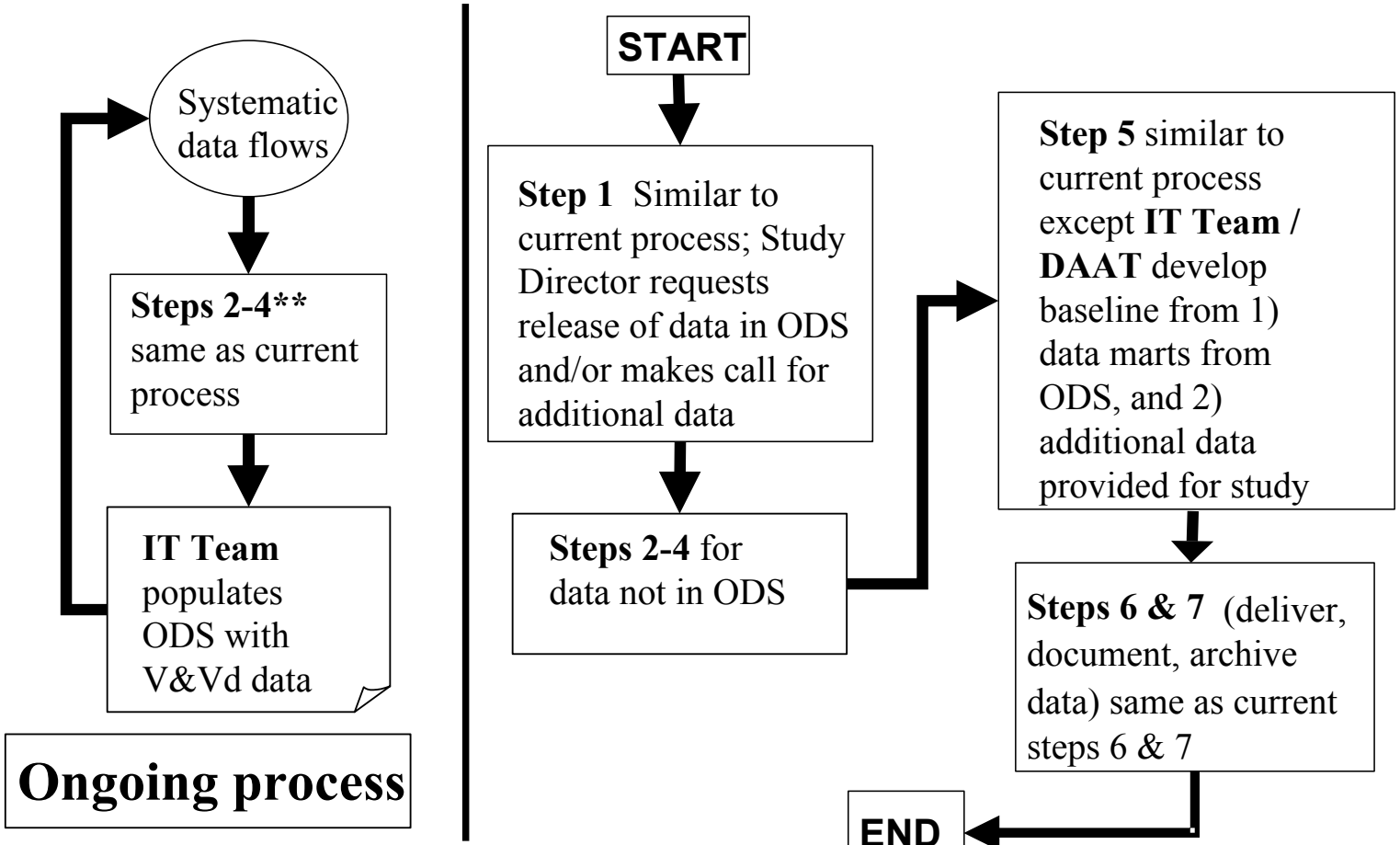
Step 7 – Document and archive the data



*Data files, metadata, discrepancy/caveat notes, study artifacts, etc.

Tab E—Internal JDS Process (future)

Future JDS Study Support Process*



*Upon maturity of systematic process and development of ODS

**Obtain data, verify/integrate data, analyze/"validate" data

Tab F—Roles and Missions of Key Players in the JDS Study Support Process

Study Director

- Works with the JDS Study Lead to articulate JDS support requirements and signs resultant Memorandum of Understanding with the JDS Director
- Working with modelers, the JDS Study Lead, study team members, and others as applicable, defines data requirements and issues data call
- Approves the accreditation of the data for use in study models (if applicable), or for study analyses
- Provides the JDS Study Lead with a listing of people authorized access to data files, with any special instructions
- Via a process defined for the study, provides approval/disapproval for reuse of study data; approves/disapproves data release requests forwarded by the JDS Director

JDS Director

- Evaluates potential for JDS support of study, including resources, and approves/disapproves JDS support
- Signs Memorandum of Understanding with the Study Director regarding JDS support for the study
- Assigns JDS Study Lead and other resources
- Monitors and supervises the activities of the JDS Study Lead and other JDS personnel assigned to support the study
- Participates in major study team meetings / meets with the Study Director periodically, and as requested by the Study Director
- Signs the accreditation recommendation memorandum upon completion of the JDS verification and validation efforts
- Signs data release request memoranda

JDS Study Lead

- Acts as liaison between JDS and the Study Director
  - Attends study team meetings
  - Advises Study Director on data issues
  - Coordinates JDS support to the study team
  - Informs JDS Director on study activities and JDS actions in support of the study
- Assists the Study Director in defining data requirements
- Prepares draft of Memorandum of Understanding between the Study Director and the JDS Director
- Briefs the Study Director and JDS Director on results of the verification and validation effort; prepares the accreditation recommendation memorandum for signature by the JDS Director
- Provides instructions to the JDS IT Team concerning construction of the study page on the JDS SIPRnet website, and concerning access to the data by study participants and others authorized by the Study Director
- Working with the JDS IT Team, prepares reports of web download activity as desired by the Study Director or JDS Director

- Coordinates reuse of data in support of other studies, working with appropriate releasing authorities; prepares data release memorandum for JDS Director signature

JDS Data Acquisition and Analysis (DAAT) Team Analysts

- Work with data sources to capture study data and metadata
- Document metadata related to source data sets
- Provide verification business rules to the JDS IT Team
- Check data for consistency with other sources ("validation checks")
- Work with data sources to resolve discrepancies identified in the verification and validation processes; document unresolved discrepancies
- Work with JDS IT Team to transform data into forms usable by the modelers/study team
- Coordinate with the JDS IT Team and data sources to verify and "validate" data for entry into the JDS Online Data Store (ODS) (future); prepare data marts as appropriate, drawing on ODS data

JDS Information Technology (IT) Team Personnel

- Pre-process raw data received from sources, as appropriate
- Verify data per business rules provided by the DAAT, and document discrepancies
- Prepare data for online analytical processing (OLAP), if applicable
- Work with the DAAT to transform data into forms usable by the modelers/study team; document all transformations
- Construct study web page on the JDS SIPRnet website according to specifications provided by the JDS Study Lead
- Post data sets, discrepancy/caveat notes, metadata files, other study artifacts, etc. to the JDS secure website
- Manage access to the JDS website according to rules provided by the Study Director via the JDS Study Lead
- Work with the JDS Study Lead to prepare reports of web activity as requested by the Study Director or JDS Director
- Write data sets and other files to alternate media (CD, JAZ, ZIP, floppy, etc.) or protocols (FTP, e-mail, etc.) when necessary to support users without SIPRnet access or with special needs
- When archive criteria are met, remove study files from the JDS website and transfer to permanent storage; maintain web page notifying users of archived studies
- Coordinate with the JDS DAAT team to verify data for entry into the JDS Online Data Store (ODS) (future); prepare data marts as appropriate, drawing on ODS data

Data sources

- Work with DAAT analysts to provide raw study data in response to the Study Director's data call
- Assist the DAAT analysts in documenting metadata
- Approve/disapprove reuse of data when requested by JDS

Modelers

- Assist the Study Director / JDS Lead in defining data requirements

Tab G—Sample Memorandum of Understanding (MOU)

(Date)

MEMORANDUM OF UNDERSTANDING between (name of study) Study Director and
Director, Joint Data Support (JDS)

The following constitutes the mutual understanding of the Study Director and the Director, Joint Data Support (JDS) regarding information and data services to be provided by JDS in support of the (name of study) study.

1. Name of study:
2. Study Director's rank or title, name, organization, phone number, fax number, mailing address, and e-mail addresses (UNCLAS and SIPRnet):
3. Study Director's data representative rank or title, name, organization, phone number, fax number, mailing address, and e-mail addresses (UNCLAS and SIPRnet):
4. Objectives of the study (list):
5. Study assumptions (list):
6. Study constraints (list):
7. Essential Elements of Analysis (EEAs) for the study (list):
8. Study timeframe (e.g., current year, POM years, other):
9. Highest classification level of data and any caveats (e.g., NOFORN, NATO, etc.)[5]:
10. Classification Guidance where appropriate (CJCSI, DoDD, or source documentation):
11. Description of data required:
    - Which models/simulations will be used, if any?
    - U.S., threat, coalition/allied, combination?
    - Forces, units, equipment, personnel? At what level (e.g., brigade/wing, battalion/squadron, etc.)
    - Characteristics and performance data required? (Describe)
    - Field specifications/data dictionaries will be provided by (point of contact)
    - Aggregations required? (Describe)
    - Use only these specified data sources (if applicable):
12. Study timeline:
    - When will JDS receive raw data from the sources?
    - What vehicle will the Study Director use to request the data (Joint Staff form 136, OSD memorandum, other)?
    - When will JDS be expected to deliver processed data to the modelers and/or the study team?
13. Initial Service data points of contact (list):
14. Initial model/simulation points of contact (list):
15. Services to be provided by JDS:

[5] Note that JDS cannot currently host data of higher classification than SECRET, although many JDS personnel are cleared for TOP SECRET and can process data at sites authorized for storage of TOP SECRET. NOFORN and NATO caveats are not problematic; other caveated or codeworded material can be dealt with on a case-by-case basis. If feasible, JDS will tag individual data elements to indicate which cause the file to be NOFORN, NATO, etc.

- Post raw data to the JDS SIPRnet website for use by study teams as the study progresses?
- Verification/integration?
- Analysis/validation?
- Develop and manage baseline and updates?
- Post excursion data sets?
- Post final data to the JDS SIPRnet website?
- When final data are produced, disposition of preliminary data:
  - Continue to post
  - Discard
  - Archive and remove from web
- Provide user access controls, or provide general (SIPRnet) access to the data?
- Provide data via other means than JSD SIPRnet website? If so, specify.
- Keep statistics on downloads of data? Provide reports? If so, to whom and how often?
- Format the data for Online Analytical Processing (OLAP)?
- Provide onsite personnel for meetings, wargame support, etc? (Specify their duties.)
- Broker the release of data between requestors and the Study Director or data sources?
- Provide presentations on and/or demonstrations of JDS capabilities?
- Reports required (e.g., status reports, etc.)? If so, specify.

16. Remarks:

(Signature and date)	(Signature and date)
Study Director	JDS Director

Tab H—Sample data accreditation memorandum

(Date)

MEMORANDUM FOR the (Insert Study Director's title)

Subject: Data accreditation for the (name of study)

The following data sets, along with the associated description of unresolved data discrepancies, have been verified, checked for consistency, and compared to other authoritative sources by Joint Data Support, in close cooperation with the study team and data providers. I recommend accreditation of these data for use in the (name of model[s], if applicable), in support of (name of study).

- (List appropriate identifying information for the data and discrepancy files. If necessary, describe the specific purpose for which the data should be accredited, including any assumptions, constraints, etc.)

(Signature)

Director, Joint Data Support

Approved:_____ Disapproved:_____

_____, Study Director

_____ (Date)

TAB I—Glossary

CD	Compact Disc
CD-ROM	Compact Disc – Read Only Memory
CJCSI	Chairman of the Joint Chiefs of Staff Instruction
COFA	Country Forces Assessment (National Ground Intelligence Center Product)
CONOPS	Concept of Operations
CVBG	Aircraft Carrier Battle Group
C4ISR	Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance
C&P	Characteristics and Performance
DAAT	JDS's Data Acquisition and Analysis Team
DCB2K	DYNAMIC COMMITMENT Beyond 2000 wargame
DIA	Defense Intelligence Agency
DoD	Department of Defense
DoDD	Department of Defense Directive
DoDI	Department of Defense Instruction
DPG	Defense Planning Guidance
EADSIM	Extended Air Defense Simulation
EEA	Essential Element of Analysis
EXCIMS	Executive Council for Modeling and Simulations
FTP	File Transfer Protocol
FUE	Forces, Units, and Equipment
HTTP	Hypertext Transfer Protocol
IPS	Defense Planning Guidance Illustrative Planning Scenario
ITEM	Integrated Theater Engagement Model
IT Team	JDS's Information Technology Team
JAMIP	Joint Analytical Model Improvement Program
JDS	Joint Data Support
JICM	Joint Integrated Contingency Model
JMEMS	Joint Munitions Effectiveness Model
JOPES	Joint Operation Planning and Execution System
JWARS	Joint Warfare System
JWMD	Joint Weapons of Mass Destruction study
LAN	Local Area Network
MDR	Metadata Repository
MOU	Memorandum of Understanding
MRS-05	Mobility Requirements Study 2005
M&S	Modeling & Simulation

NATO	North Atlantic Treaty Organization
NEA	Northeast Asia
NOFORN	Dissemination to foreign nationals not authorized
ODS	Operational Data Store
OLAP	Online Analytical Processing
OSD	Office of the Secretary of Defense
PA&E	Program Analysis and Evaluation
POC	Point of Contact
POM	Program Objective Memorandum
QDR	Quadrennial Defense Review
SABSEL	Saber/Selector Weapons Effectiveness Model
SIPRnet	Secret Internet Protocol Routed Network
SQL	Structured Query Language
SWA	Southwest Asia
TACWAR	Tactical Warfare Simulation Model
TPFDD	Time Phased Force Deployment Data(base)
TUCHA	Type Unit Characteristics file
UIC	Unit Identification Code
ULN	Unit Line Number
VIC	Vector in Command model
VV&A	Verification, Validation, and Accreditation
V&V	Verification and Validation
WAN	Wide Area Network